



**Texas State Soil and Water Conservation Board  
CWA §319(h) Nonpoint Source Grant Program  
FY 2015 Workplan 15-06**

**SUMMARY PAGE**

Title of Project:	Continued Statewide Delivery of the Lone Star Healthy Streams Program
Project Goals:	<ul style="list-style-type: none"> <li>• Facilitate continued and enhanced statewide implementation of the Lone Star Healthy Streams (LSHS) program through local and distance educational events to help reduce bacterial contamination originating from grazing and dairy cattle, poultry, and horses in Texas surface waters.</li> <li>• Evaluate program success by measuring changes in producer knowledge and understanding regarding bacteria pollution and BMPs to minimize bacterial contamination as well as intentions to adopt recommended BMPs.</li> <li>• Communicate barriers to BMP adoption identified in the statewide evaluation of agricultural producers conducted for TSSWCB project 12-08 (Statewide Delivery of the Beef Cattle, Dairy Cattle, Poultry and Horse Components of the Lone Star Healthy Streams Program) to federal and state agencies including the NRCS and TSSWCB to enable program modifications, as appropriate, that will increase adoption of water quality BMPs.</li> </ul>
Project Tasks:	(1) Project Administration; (2) Coordinate and deliver LSHS locally or through distance education in targeted watersheds; (3) Evaluate the effectiveness of the LSHS program; (4) Coordinate meetings with state agencies to present evaluation results from TSSWCB project 12-08.
Measures of Success:	<ul style="list-style-type: none"> <li>• Delivery of a minimum of 10 LSHS local and 3 distance educational trainings per year.</li> <li>• Number of livestock producers and landowners participating in educational events delivered locally or through distance education;</li> <li>• Number of unique visitors to the LSHS project website (<a href="http://lshs.tamu.edu">http://lshs.tamu.edu</a>);</li> <li>• Number of factsheets, publications, and other educational materials distributed regarding the LSHS program and BMPs to reduce bacterial contamination;</li> <li>• Increased knowledge and understanding of livestock producers and landowners on bacteria pollution and BMPs to reduce bacteria runoff and increased understanding of the expected adoption of BMPs.</li> <li>• Enhanced coordination among state agencies to address barriers identified in TSSWCB project 12-08 statewide livestock producer evaluation to increase conservation program success and BMP adoption.</li> </ul>
Project Type:	Implementation (X); Education (X); Planning ( ); Assessment ( ); Groundwater ( )

Status of Waterbody on 2012 Texas Integrated Report	Segment ID:	Parameter	Category
	0612	Bacteria	5b
	1103	Bacteria	5a
		Depressed DO	5a
	1103A	Bacteria	5a
	1103B	Bacteria	5a
	1103C	Bacteria	5a
		Depressed DO	5c
	1103D	Bacteria	5c
	1103E	Bacteria	5b
	1104	Bacteria	5a
		Depressed DO	5c
	1804A	Bacteria	5c
	1428C	Bacteria	4a
	1004E	Bacteria	5a
	1008	Bacteria	5a
		Depressed DO	5b
	1008H	Bacteria	5a
	1009	Bacteria	5a
	1009C	Bacteria	5a
	1009D	Bacteria	5a
	1009E	Bacteria	5a
	1010	Bacteria	5a
	1011	Bacteria	5a
	1810	Bacteria	4b
	1217B	Depressed DO	5c
	1217D	Depressed DO	5b
	1221	Bacteria	5b
	1221A	Depressed DO	5c
		Bacteria	5b
	1221B	Bacteria	5b
	1221D	Bacteria	5b
	1221F	Bacteria	5b
	1901	Bacteria	4a
	2311	Depressed DO	5c
	1301	Bacteria	5c
	1302	Bacteria	5b
	1302A	Bacteria	5b
	1302B	Bacteria	5b
		Depressed DO	5c
		Depressed DO	5a
	1245	Bacteria	5b
	1245C	Bacteria	5b
	1245D	Bacteria	5b
	1245F	Bacteria	5b
	1245I	Bacteria	5b

Project Location (Statewide or Watershed and County)	Attoyac Bayou Watershed upstream of Sam Rayburn Reservoir in San Augustine, Nacogdoches, Shelby, and Rusk Counties; Bastrop Bayou Watershed in Brazoria County; Buck Creek Watershed in Childress, Collingsworth and Donley Counties; Dickinson Bayou in Brazoria and Galveston Counties; Geronimo Creek Watershed in Guadalupe and Comal Counties; Gilleland Creek in Travis County; Lake Granbury Watershed in Hood, Parker, Palo Pinto, Ranger, Erath, and Jack Counties; Lake Houston Area Watersheds in Grimes, Harris, Liberty, Montgomery, San Jacinto, Walker, and Waller Counties; Lampasas River Watershed in Bell, Burnet, Coryell, Hamilton, Lampasas, Mills, and Williamson Counties; Leon River Watershed below Proctor Lake and above Belton Lake in Comanche, Hamilton, Erath, Coryell, Mills and Bell Counties; Lower San Antonio River Watershed in DeWitt, Goliad, Guadalupe, Karnes, Refugio, Victoria, and Wilson Counties; Pecos River Watershed in Texas in Crane, Crockett, Pecos, Reeves, Terrell, Upton, and Ward Counties; Plum Creek Watershed in Caldwell, Hays, and Travis Counties; San Bernard River Watershed in Austin, Colorado, Wharton, Fort Bend, and Brazoria Counties; Upper Oyster Creek in Fort Bend County					
Key Project Activities:	Hire Staff (X); Surface Water Quality Monitoring ( ); Technical Assistance ( ); Education (X); Implementation ( ); BMP Effectiveness Monitoring ( ); Demonstration ( ); Planning ( ); Modeling ( ); Bacterial Source Tracking ( ); Other ( )					
2012 Texas NPS Management Program Reference	<ul style="list-style-type: none"> <li>• Component One LTGs 1, 2, 4</li> <li>• Component One STGs 3A, 3B, 3F</li> <li>• Component Two</li> <li>• Component Three</li> </ul>					
Project Costs:	Federal:	\$318,056	Non-Federal:	\$212,116	Total:	\$530,172
Project Management:	Texas A&M AgriLife Extension Service (Extension)					
Project Period:	November 1, 2015 – October 31, 2017					

**Part I – Applicant Information**

Applicant							
Project Lead		Larry A. Redmon					
Title		Professor and State Forage Specialist Soil and Crop Sciences					
Organization		Texas A&M AgriLife Extension Service					
E-mail Address		<a href="mailto:l-redmon@ag.tamu.edu">l-redmon@ag.tamu.edu</a>					
Street Address		2474 TAMU					
City	College Station	County	Brazos	State	TX	Zip Code	77843-2472
Telephone Number		979.845.2425		Fax Number		979.845.0604	

Project Partners	
Names	Roles & Responsibilities
Texas State Soil and Water Conservation Board (TSSWCB)	Provide state oversight and management of all project activities and ensure coordination of activities with related projects.
Texas A&M AgriLife Extension Service - Department of Soil & Crop Sciences (Extension)	Provide overall project management including project coordination, submission of quarterly and final reports, delivery of LSHS through local and distance education, and evaluation of project effectiveness.
Department of Agricultural Leadership, Education, and Communications at Texas A&M University (ALEC)	Assist in the program evaluation component.
Texas Water Resources Institute (TWRI)	Host and maintain the LSHS website for the dissemination of information and track website usage.
Department of Animal Science at Texas A&M University	Provide guidance on poultry, dairy, and horse components and assist in program delivery.

## Part II – Project Information

Project Type							
Surface Water	X	Groundwater					
Does the project implement recommendations made in a completed Watershed Protection Plan or an adopted TMDL or Implementation Plan?				Yes	X	No	
If yes, identify the document.		Draft Bastrop Bayou Watershed Protection Plan; Buck Creek Watershed Protection Plan; Eight Total Maximum Daily Loads for Indicator Bacteria in Dickinson Bayou and Three Tidal Tributaries; Geronimo and Alligator Creeks Watershed Protection Plan; Implementation Plan for One Total Maximum Daily Load for Bacteria in Gilleland Creek; Lake Granbury Watershed Protection Plan; Fifteen TMDLs for Indicator Bacteria in Watersheds of the Lake Houston Area; Watershed Protection Plan for the Leon River Below Proctor Lake and Above Belton Lake, One Total Maximum Daily Load for Bacteria in the Lower San Antonio River; A Watershed Protection Plan for the Pecos River in Texas; Plum Creek Watershed Protection Plan; San Bernard River Watershed Protection Plan; One TMDL for Bacteria in Upper Oyster Creek, Lampasas River Watershed Protection Plan					
If yes, identify the agency/group that developed and/or approved the document.		Bastrop Bayou Stakeholder Group facilitated by Houston-Galveston Area Council, Buck Creek Watershed Partnership facilitated by Texas Water Resources Institute and TSSWCB; Galveston Bay Estuary Program and TCEQ; TCEQ, University of Houston, and CDM; The Geronimo and Alligator Creeks Watershed Partnership facilitated by GBRA, Texas A&M AgriLife Extension Service and TSSWCB; TCEQ and the Lower Colorado River Authority; The Lake Granbury Watershed Protection Plan Stakeholders Committee facilitated by the Brazos River Authority and TCEQ; TCEQ and James Miertschin & Associates, Inc.; Brazos River Authority; TCEQ and James Miertschin & Associates, Inc.; Landowners and entities in the Pecos River watershed, facilitated by AgriLife Extension, TWRI and TSSWCB; Plum Creek Watershed Partnership facilitated by Texas A&M AgriLife Extension Service and TSSWCB; Houston-Galveston Area Council and TCEQ; TCEQ and Texas Institute of Applied Environmental Research		Year Developed		2011; 2012; 2012, 2012, 2007, 2011, 2011; 2011; 2008; 2008; 2008; 2011; 2007; 2013	

Watershed Information				
Watershed Name(s)	Hydrologic Unit Code (12Digit)	Segment ID	305(b) Category	Size (Acres)
Attoyac Bayou	120200050301 – 120200050307, 120200050401 – 120200050406, 120200050501	0612	5b	426,880
Bastrop Bayou Tidal	120402050400	1105	2	188,965
Buck Creek	111201050204, 111201050208, 111201050303, 111201050305 – 111201050307, 111201050401 – 111201050407, 111201050501 – 111201050502	0207A	2	187,270
Dickinson Bayou	120402040200	1103	5a	63,287
Geronimo Creek (including its tributary, Alligator Creek)	121002020110, 121002020111	1804A	5c	44,152
Gilleland Creek	120903010106	1428C	4a	52,866
Lake Granbury	120602010601 – 0608, 120602010701 – 0706, 120602010801 – 120602010809, 120602010901 – 120602010907, 120602011001 – 120602011004, 120602011101 – 120602011110, 120602011201 – 120602011208	1205	2	1,335,138
Stewarts Creek	120401010401	1004E	5a	21,051
Spring Creek	120401020201, 120401020205, 120401020209, 120401020212, 120401020213	1008	5a, 5b	100,148
Willow Creek	120401020210	1008H	5a	35,310
Cypress Creek	120401020103, 120401020104, 120401020106, 120401020107	1009	5a	24,299
Faulkey Gully	120401020106	1009C	5a	35,082
Spring Gully	120401020106	1009D	5a	35,082
Little Cypress Creek	120401020105	1009E	5a	34,687
Caney Creek	120401030101, 120401030102, 120401030104, 120401030105, 120401030110	1010	5a	114,773
Peach Creek	120401030106 – 120401030109	1011	5a	308,922
Lampasas River (Lampasas River above Stillhouse Hollow Lake, Rocky Creek, Sulphur Creek, Simms Creek)	120702030101 – 120702030509	1217 1217A 1217B 1217C	5c 2 2 2	839,800
Leon River below Proctor Lake and above Belton Lake	120702010501 – 120702010509, 120702010601 – 120702010605, 120702010701 – 120702010705, 120702010801 – 120702010806, 120702010901 – 120702010908, 120702011002	1221	5a	871,488

Lower San Antonio River	121003030202, 121003030205, 121003030206, 121003030403, 121003030404, 121003030501, 121003030503, 121003030505, 121003030604 – 121003030608, 121003040405	1901	4a	776,863
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Pecos River	130700010201 - 130700010207; 130700010301 - 130700010305 130700010401 - 130700010408; 130700010503 - 130700010506 130700010601 - 130700010605; 130700010701 - 130700010705 130700010801 - 130700010803; 130700010901 - 130700010906 130700011001 - 130700011006; 130700030101 - 130700030106 130700030201 - 130700030204; 130700030301 - 130700030308 130700030401 - 130700030403; 130700040101 - 130700040106 130700040301 - 130700040305; 130700040401 - 130700040406 130700040501 - 130700040506; 130700040601 - 130700040605 130700040701 - 130700040705; 130700040801 - 130700040806 130700050101 - 130700050106; 130700050201 - 130700050205 130700050301 - 130700050304; 130700060101 - 130700060105 130700060201 - 130700060206; 130700060301 - 130700060306 130700060401 - 130700060405; 130700060501 - 130700060506 130700060601 - 130700060605; 130700070206; 130700070209 130700070507; 130700070507 - 130700070510 130700070601 - 130700070607; 130700070701 - 130700070706 130700070801 - 130700070807; 130700070901 - 130700070903 130700071001 - 130700071006; 130700071101 - 130700071102 130700071201 - 130700071202; 130700071301 - 130700071305 130700071401 - 130700071406; 130700071501 - 130700071506 130700071601 - 130700071603; 130700071701 - 130700071709 130700071801 - 130700071806; 130700071901 - 130700071904 130700072001 - 130700072008; 130700072101 - 130700072106 130700080101 - 130700080109; 130700080201 - 130700080208 130700080301 - 130700080308; 130700080401 - 130700080405 130700080501 - 130700080508; 130700080601 - 130700080604 130700080701 - ...0703; 130700090101 - ...0109	2311	5c	8,958,079
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Plum Creek	110901050702, 110901050703, 111002030102, 111301050208, 111302090204, 120100040204, 120301010104, 120500030306, 120601020401, 120702010804, 120702010805, 120800020403, 121002030401 – 121002030403	1810	4b	288,240
San Bernard River	120904010101, 120904010102, 120904010104, 120904010109, 120904010205, 120904010207, 120904010302, 120904010304 – 120904010306, 120904010308	1301 1302 1302A 1302B	5c 5a 5c 5c	672,000
Upper Oyster Creek	120402050100, 120402050200, 120701040403	1245	5a	65,649

**Water Quality Impairment**

Describe all known causes (pollutants of concern) of water quality impairments or concerns from any of the following sources: *2012 Texas Integrated Report*, Clean Rivers Program Basin Summary/Highlights Reports or other documented sources.

Segment ID	Body Name	Impairment	Code
0612	Attoyac Bayou	Bacteria	5b
1103	Dickinson Bayou Tidal	Bacteria	5a
		Depressed DO	5a
1103A	Bensons Bayou	Bacteria	5a
1103B	Bordens Gully	Bacteria	5a
1103C	Geisler Bayou	Bacteria	5a
		Depressed DO	5c
1103D	Gum Bayou	Bacteria	5c
1103E	Cedar Creek	Bacteria	5b
1104	Dickinson Bayou Above Tidal	Bacteria	5a
		Depressed DO	5c
1804A	Geronimo Creek	Bacteria	5c
1428C	Gilleland Creek	Bacteria	4a
1004E	Stewarts Creek	Bacteria	5a
1008	Spring Creek	Bacteria	5a
		Depressed DO	5b
1008H	Willow Creek	Bacteria	5a
1009	Cypress Creek	Bacteria	5a
1009C	Faulkey Gully	Bacteria	5a
1009D	Spring Gully	Bacteria	5a
1009E	Little Cypress Creek	Bacteria	5a
1010	Caney Creek	Bacteria	5a
1011	Peach Creek	Bacteria	5a
2311	Upper Pecos River	Depressed DO	5c
1810	Plum Creek	Bacteria	4b
1217B	Sulphur Creek	Depressed DO	5c
1217D	North Fork Rocky Creek	Depressed DO	5b
1221	Leon River below Proctor Lake	Bacteria	5b
1221A	Resley Creek	Depressed DO	5c
		Bacteria	5b
1221B	South Leon River	Bacteria	5b
1221D	Indian Creek	Bacteria	5b
1221F	Walnut Creek	Bacteria	5b
1901	Lower San Antonio River	Bacteria	4a
1301	San Bernard River Tidal	Bacteria	5c
1302	San Bernard River Above Tidal	Bacteria	5b
1302A	Gum Tree Branch	Bacteria	5b
1302B	West Bernard Creek	Bacteria	5b
		Depressed DO	5c
1245	Upper Oyster Creek	Depressed DO	5a
1245C	Bullhead Bayou	Bacteria	5b
1245D	Unnamed Tributary of Bullhead Bayou	Bacteria	5b
1245F	Alcorn Bayou	Bacteria	5b
1245I	Steep Bank Creek	Bacteria	5b

Water Quality Concerns			
0612	Attoyac Bayou	Bacteria	CN
0207A	Buck Creek	Nitrate	CS
1105	Bastrop Bayou Tidal	Bacteria	CN
		Depressed DO	CS
1105A	Flores Bayou	Depressed DO	CS
1105B	Austin Bayou Tidal	Depressed DO	CN
1105C	Austin Bayou Above Tidal	Depressed DO	CS
1105E	Brushy Bayou	Depressed DO	CS
1103	Dickinson Bayou Tidal	Chlorophyll-a	CS
		Depressed DO	CS
1103B	Bordens Gulley	Depressed DO	CS
1103C	Geisler Bayou	Depressed DO	CS
1103D	Gum Bayou	Bacteria	CN
1103E	Cedar Creek	Depressed DO	CS
1104	Dickinson Bayou Above Tidal	Depressed DO	CS
1804A	Geronimo Creek	Nitrate	CS
1428C	Gilleland Creek	Bacteria	CN
		Nitrate	CS
		Orthophosphorus	CS
1008	Spring Creek	Depressed DO	CS
		Nitrate	CS
		Orthophosphorus	CS
		Total phosphorus	CS
1008H	Willow Creek	Nitrate	CS
		Orthophosphorus	CS
		Total phosphorus	CS
1009	Cypress Creek	Nitrate	CS
		Orthophosphorus	CS
		Total phosphorus	CS
1009C	Faulkey Gully	Nitrate	CS
		Orthophosphorus	CS
		Total phosphorus	CS
1009D	Spring Gully	Nitrate	CS
		Orthophosphorus	CS
		Total phosphorus	CS
1009E	Little Cypress Creek	Nitrate	CS
		Orthophosphorus	CS
		Total phosphorus	CS
1011	Peach Creek	Bacteria	CN
1217B	Sulphur Creek	Depressed DO	CS
1221	Leon River Below Proctor lake	Chlorophyll-a	CS
		Depressed DO	CS
1221A	Resley Creek	Chlorophyll-a	CS
		Nitrate	CS
		Bacteria	CN
		Orthophosphorus	CS
1221B	South Leon River	Depressed DO	CS
1221D	Indian Creek	Depressed DO	CN
		Nitrate	CS
		Orthophosphorus	CS

1205	Lake Granbury	Chlorophyll-a	CS
1901	Lower San Antonio River	Bacteria	CN
		Chlorophyll-a	CS
		Nitrate	CS
		Orthophosphorus	CS
		Total phosphorus	CS
2311	Upper Pecos River	Bacteria	CN
		Chlorophyll-a	CS
		Depressed DO	CS
		Golden alga	CN
1810	Plum Creek	Depressed DO	CS
		Nitrate	CS
		Orthophosphorus	CS
		Total phosphorus	CS
1301	San Bernard River Tidal	Chlorophyll-a	CS
1302	San Bernard River Above Tidal	Depressed DO	CS
1302A	Gum Tree Branch	Bacteria	CN
		Depressed DO	CS
1302B	West Bernard Creek	Depressed DO	CS
1245	Upper Oyster Creek	Chlorophyll-a	CS
		Depressed DO	CS
		Nitrate	CS
		Orthophosphorus	CS
1245A	Red Gully	Bacteria	CN
		Nitrate	CS
		Orthophosphorus	CS
1245E	Flewellen Creek	Bacteria	CN
1245F	Alcorn Bayou	Nitrate	CS
		Orthophosphorus	CS
1245I	Steep Bank Creek	Orthophosphorus	CS
1245J	Stafford Run	Bacteria	CN
<b>Special Interest</b>			
1105	Bastrop Bayou Tidal	Bacteria	WAP
0207A	Buck Creek	Bacteria	WAP
1205	Lake Granbury	Bacteria	WAP
1217	Lampasas River Above Stillhouse Hollow Lake	Bacteria	WAP

## Project Narrative

## Problem/Need Statement

Excessive levels of fecal indicator bacteria (e.g. *E. coli*) remain a major cause of water quality impairment throughout Texas. According to the 2012 Texas Integrated Report for Clean Water Act Sections 305(b) and 303(d), a total of 568 impairments are included in Category 5 with impairments due to elevated bacteria representing the highest percentage (45%). Total Maximum Daily Loads (TMDLs), TMDL Implementation Plans (I-Plans), and watershed protection plans (WPPs) continue to be developed to address these impairments.

Fecal indicator bacteria are common inhabitants of the intestines of all warm-blooded animals, including livestock. Although watersheds can be affected by microbial pollution from a wide variety of sources, livestock are increasingly under scrutiny. For example, bacterial source tracking (BST) results in the Lampasas River Watershed revealed livestock (cattle, avian livestock, and other non-avian livestock) accounted for a total of 22% of the *E. coli* identified while in the Leon River Watershed, livestock accounted for a total of 19%. One mechanism for reducing bacterial contamination from livestock species is to promote greater adoption, implementation, and maintenance of best management practices (BMPs) by livestock producers and landowners across the state. However, to accomplish this, significant resources are needed to educate and inform livestock producers and landowners about bacteria impairments, their causes, and most importantly, BMPs that can be implemented to help reduce bacterial contamination.

Surface water contamination by bacteria is not isolated to one watershed or region, but is instead a significant statewide issue. Consequently, through the joint vision of the TSSWCB and Extension, the LSHS program was developed and pilot tested through TSSWCB project 09-06 entitled, *Development of a Synergistic, Comprehensive Statewide Lone Star Healthy Streams Program*. This piloting period provided an opportunity to refine the program materials and components in preparation for statewide implementation of the program. Through TSSWCB project 12-08, *Statewide Delivery of the Beef Cattle, Dairy Cattle, Poultry and Horse Components of the Lone Star Healthy Streams Program*, over 30 education and training events have been conducted to date reaching over 50 counties and nearly 1,600 citizens with demand for the program increasing. Through both of these projects, presentations were developed, manuals were published, and other resources made available for online delivery. It is estimated that for every \$1 spent on water-related conservation programs in Texas, \$4-\$7 are saved, yielding a potential economic impact of the Lone Star Healthy Streams program to be \$1.26 to \$2.2 million.

Another component of TSSWCB project 12-08 was a statewide evaluation targeting beef cattle producers in Texas. The goal of this effort was to evaluate potential barriers to the adoption and implementation of water quality BMPs. Results of the evaluation have been analyzed and submitted for publication in appropriate journals. An executive summary is being developed and will enable conservation program managers to better understand BMP adoption behavior by livestock producers in the state. Consequently, it is imperative these results be shared with state water quality and natural resource agencies to improve design practices and programs that encourage and secure participation, facilitate sustained adoption of practices, and meet water quality goals in the most cost effective manner. Extension, with the help of the TSSWCB, will facilitate meetings with state water quality and natural resource agencies to disseminate the results so identified barriers to BMP adoption can be addressed.

The LSHS program is an important water quality education initiative in Texas. To help meet increasing demands for the program, this project will provide continued statewide implementation to support and enhance current and future watershed protection efforts in Texas and provide a basis for gaining landowner participation and adoption of BMPs.

## Project Narrative

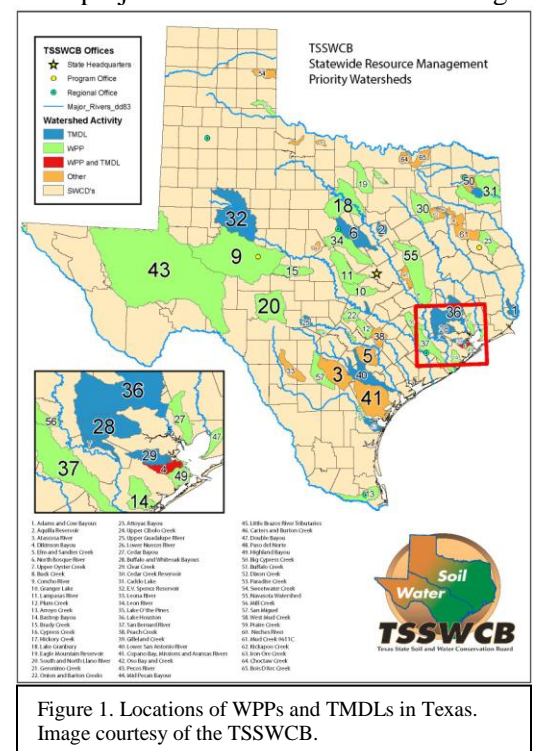
General Project Description (Include Project Location Map)

This project will continue statewide delivery of the Lone Star Healthy Streams program through local and distance education events in targeted watersheds across Texas.

**Local Watershed and Distance Education.** Extension will work with its Regional Program Leaders, County Extension Agents, watershed coordinators, and Extension Specialists around the state to deliver the LSHS program in bacteria impaired watersheds through local and distance training events. Events will be coordinated through local County Extension Agents and their program planning committees. The LSHS website, online training course, and resource manuals will continue to be used for program implementation; additional written materials will be developed as needed.

Locations for training programs will be selected in concert with the TSSWCB and will target bacteria impaired watersheds where livestock and poultry have been identified as potential contributors, as well as those watersheds currently undergoing development and/or implementation of a WPP, TMDL, or I-Plan (Figure 1). Training programs will also be conducted at field days, conferences, and other county extension events as necessary. Incorporating LSHS programs into other types of events will enhance coordination among various state projects and entities also conducting water-related education, and maximize contact with producers at all levels of operation.

Both local and distance education programs will vary in length and topic depending on the audience or location of the program. Distance education events will be delivered utilizing a new mobile platform called TTVN WebMeeting, an enterprise web conference system developed exclusively for Texas A&M AgriLife. This software programs allow a presenter to load materials onto a platform while interested participants log in from a remote site to listen and view the presentation live. Presentations can also be recorded so that individuals who miss the live presentation can log on and see the event at a later time. A minimum of 10 local events and 3 distance education events will be conducted annually. Curriculum and training materials have already been developed to address topics and BMPs related to beef cattle, dairy cattle, poultry, and horses. As part of each training program, participants will learn about water quality law and policy, sources of bacteria in Texas waterways, bacteria fate and transport, benefits of voluntary conservation practices, sources of financial and technical assistance, and livestock-specific BMPs that are designed to reduce bacterial contamination of runoff.



One particular focus area in this new project will be in east Texas. Through the NRCS's National Water Quality Initiative (NWQI), five subwatersheds in Upshur, Camp, Titus, and Morris counties were recently selected as priority watersheds. These subwatersheds eventually reach downstream into Lake O' the Pines, which is an important municipal, cultural, recreational, ecological, and aesthetic asset in the state. Through this initiative, livestock producers and landowners will be eligible to receive financial assistance for installing conservation practices designed to improve water quality. Extension will focus a portion of its educational efforts in this region by utilizing the expertise of an Assistant Professor and Extension Specialist located at the Texas A&M AgriLife Research and Extension Center at Overton to facilitate educational programs targeting these priority watersheds.

**Evaluation and Assessment.** The impacts and effectiveness of the LSHS program will be assessed using a multi-stage evaluation approach. The first stage will use a pre-test/post-test evaluation strategy at the beginning and end of both watershed and computer-based training programs. The pre-test will pose knowledge-based questions that include a combination of multiple choice and true/false questions. The post-test will measure the same knowledge-based questions to determine the knowledge gained. In addition, the post-test will include 'satisfaction' and 'intentions to adopt' questions. The 'intentions to adopt' questions will focus on BMPs that participants should adopt based on what they have

learned and the practice's ability to reduce bacterial contamination.

*Communication of Evaluation Results with State Agencies.* Through TSSWCB project 12-08 titled, *Statewide Delivery of the Beef Cattle, Dairy Cattle, Poultry and Horse Components of the Lone Star Healthy Streams Program*, Extension developed and implemented a statewide evaluation designed specifically to identify the factors that motivate and barriers that limit producer adoption/implementation and sustained management of BMPs known to reduce bacterial contamination of waterbodies. Demographic, socioeconomic, policy, and farm characteristics were assessed to identify and better understand the controlling factors and adoption behavior of Texas beef cattle producers. With assistance from the Southern Plains Regional Field Office of the National Agricultural Statistics Service, the evaluation was mailed to a random sample of 1,700 beef cattle producers in Texas. The sample was stratified to obtain representation from producers owning small, medium, and large beef cattle herds. This portion of TSSWCB project 12-08 has been completed and results submitted for publication in appropriate journals. An executive summary is being produced for dissemination to all interested parties interested in barriers to BMP adoption in Texas.

To ensure the results from the evaluation are shared with appropriate agencies and organizations across the state, Extension, with the help of the TSSWCB, will facilitate a minimum of two meetings with state water quality and natural resources agencies. The intent of these meetings will be to communicate findings from the evaluation including barriers to participation in conservation programs and BMP implementation, and characteristics of producers most likely to adopt BMPs. The goal of these efforts will be to help conservation agencies forge a plan of action to remove or minimize programmatic barriers and ultimately, to substantively enhance adoption of water quality BMPs across the state.

## Tasks, Objectives and Schedules

Task 1:	Project Administration					
Costs:	Federal:	\$15,903	Non-Federal:	\$10,606	Total:	\$26,509
Objective:	Administer, coordinate, and monitor all work performed under the project including technical and financial supervision and preparation of quarterly progress and final reports.					

Subtask 1.1:	Extension will prepare QPRs for submission to the TSSWCB. QPRs shall document all activities performed within a quarter and shall be submitted by the 15 <sup>th</sup> of January, April, July and October. QPRs shall be distributed to all project partners.			
	Start Date:	Month 1	Completion Date:	Month 24
Subtask 1.2:	Extension will perform accounting functions for project funds and will submit appropriate reimbursement forms to TSSWCB at least quarterly.			
	Start Date:	Month 1	Completion Date:	Month 24
Subtask 1.3:	Extension will host coordination meetings or conference calls, at least quarterly, with project partners to discuss project activities, project schedule, communication needs, deliverables, and other requirements. Extension will develop lists of action items needed following each project coordination meeting and distribute to project personnel.			
	Start Date:	Month 1	Completion Date:	Month 24
Subtask 1.4:	Extension, with assistance from project partners, will develop the final report assessing the effectiveness of the LSHS program, including the local and distance education events.			
	Start Date:	Month 1	Completion Date:	Month 24
Deliverables	<ul style="list-style-type: none"> <li>• Quarterly progress reports in electronic format</li> <li>• Reimbursement Forms and necessary documentation in hard copy format</li> <li>• Lists of action items from project coordination meetings</li> <li>• Final report</li> </ul>			

### Tasks, Objectives and Schedules

Task 2:	Coordinate and deliver LSHS locally or through distance education in targeted watersheds					
Costs:	Federal:	\$190,834	Non-Federal:	\$127,270	Total:	\$318,104



Objective:	Continue delivery of a statewide educational program that provides livestock producers and landowners applicable information on water quality law and policy, sources of bacteria in Texas waterways, bacteria fate and transport, benefits of voluntary conservation practices, sources of technical assistance and financial incentives, and livestock-specific BMPs that are designed to reduce bacterial contamination of runoff. Extension will work in cooperation with the TSSWCB and other agencies and organizations as appropriate to guide program delivery and selection of training locations.		
Subtask 2.1:	Extension will employ a Program Specialist who will serve under the leadership of the Extension State Forage Specialist as the full-time LSHS Program Coordinator and will be responsible for promoting, coordinating, and delivering local and distance education LSHS training events.		
	Start Date:	Month 1	Start Date: Month 24
Subtask 2.2:	Extension will work in concert with state and local organizations to select locations for the watershed-based TWS training events. Extension will coordinate efforts with state agencies and organizations already involved in WPP/TMDL processes or who are planning future WPP/TMDL processes in specific watersheds. Additional watersheds will be selected based on impairment status, environmental sensitivity, and/or other priority issues identified by a partner agency or organization. Extension and TSSWCB will periodically make a collaborative decision to re-prioritize and add to/remove from the list of watersheds.		
	Start Date:	Month 1	Start Date: Month 24
Subtask 2.3:	Extension will actively market LSHS programs through news releases (AgriLife News and local media outlets), internet postings, radio, newsletter announcements, public/conference presentations, flyers, etc., to enhance program participation and resource utilization. TSSWCB will be provided all promotional materials for review at least 2 to 3 weeks prior to distribution.		
	Start Date:	Month 1	Start Date: Month 24
Subtask 2.4:	<p>Extension will coordinate with Extension Regional Program Leaders, County Extension Agents, local SWCDs, NRCS, TSSWCB, watershed coordinators, and others to deliver the LSHS educational program to bacteria-impaired or threatened watersheds throughout the state. Trainings will include the standardized resources developed in Subtask 3.3 of TSSWCB project 09-06 <i>Development of a Synergistic, Comprehensive Statewide Lone Star Healthy Streams Program</i>. Production characteristics of each watershed will dictate the LSHS component(s) to be discussed and the mode of delivery (local or distance). Anticipated workshops to be delivered during the project period include:</p> <p><i>Local Training Events (20):</i></p> <ul style="list-style-type: none"> <li>• Lone Star Healthy Streams (Grazing Cattle component) workshop – 14 events</li> <li>• Lone Star Healthy Streams (Dairy Cattle component) workshop – 1 event</li> <li>• Lone Star Healthy Streams (Horses component) workshop – 3 events</li> <li>• Lone Star Healthy Streams (Poultry component) workshop – 2 events</li> </ul> <p><i>Distance Training Events (6):</i></p> <ul style="list-style-type: none"> <li>• Lone Star Healthy Streams (Grazing Cattle component) workshop – 3 events</li> <li>• Lone Star Healthy Streams (Dairy Cattle component) workshop – 1 event</li> <li>• Lone Star Healthy Streams (Horses component) workshop – 1 event</li> <li>• Lone Star Healthy Streams (Poultry component) workshop – 1 event</li> </ul>		
	Start Date:	Month 1	Start Date: Month 24
Subtask 2.5:	Extension will participate in meetings as appropriate in order to efficiently and effectively achieve project goals and summarize activities and achievements made throughout the course of this project. Such meetings may include, but are not limited to, local soil and water conservation districts (SWCDs), the Texas Watershed Planning Short Course, Texas Watershed Coordinator Roundtables, the TSSWCB Regional Watershed Coordination Steering Committee, the annual meeting of Texas Soil and Water Conservation District Directors, the National Water Quality Conference, and the Society for Range Management annual meeting.		

	Start Date:	Month 1	Start Date:	Month 24
Subtask 2.6:	Extension, with assistance from TWRI, will continue to host and maintain a website ( <a href="http://lshs.tamu.edu/">http://lshs.tamu.edu/</a> ) to serve as a public clearinghouse for all project related information. All workshop information as well as other material will be available on this website. The number of unique visitors to the website and distribution of <i>Lone Star Healthy Streams</i> educational materials will be tracked to assess impact and reported each quarter.			
	Start Date:	Month 1	Start Date:	Month 24
Deliverables	<ul style="list-style-type: none"> <li>• LSHS Website</li> <li>• Collection of press releases, newspaper articles, newsletters, public information statements, etc., as developed and disseminated</li> <li>• Tracking report of website usage</li> <li>• Schedule of program delivery, participation in workshops and educational events, and related activities</li> <li>• List of participants from educational events</li> </ul>			

Tasks, Objectives and Schedules						
Task 3:	Evaluate the effectiveness of the LSHS Program					
Costs:	Federal:	\$63,611	Non-Federal:	\$42,423	Total:	\$106,034
Objective:	To measure both knowledge and behavior changes of individuals participating in the LSHS program using a pre/post evaluation approach.					
Subtask 3.1:	Extension will utilize pre-test/post-test evaluations (for both local and distance education events) to measure changes in knowledge of participants regarding water quality law and policy, sources of bacteria in Texas waterways, bacteria fate and transport, benefits of voluntary conservation practices, sources of financial and technical assistance, and livestock-specific BMPs that are designed to reduce bacterial contamination of runoff; to evaluate participant satisfaction with the program; and to evaluate participant’s intentions to change their behavior as a result of the program					
	Start Date:	Month 1		Start Date:	Month 24	
Subtask 3.2:	With assistance from ALEC, develop and deliver stage 2 mailout evaluation specifically designed to assess the barriers and factors related to the adoption and implementation of BMPs known to reduce bacterial contamination of water bodies.					
	Start Date:	Month 1		Start Date:	Month 24	
Subtask 3.3:	With assistance from ALEC, analyze test results using descriptive, correlational, and analysis of variance statistical procedures. Results will be used to periodically evaluate and modify LSHS program materials and incorporated into the final report.					
	Start Date:	Month 1		Start Date:	Month 24	
Deliverables	<ul style="list-style-type: none"><li>• Pre-/post-test evaluations for watershed- and computer-based LSHS trainings.</li><li>• Results from pre/post evaluations.</li><li>• Research briefs summarizing results and project updates.</li></ul>					

Tasks, Objectives and Schedules					
Task 4:	Coordinate meetings with state agencies to discuss evaluation results from TSSWCB project 12-08				
Costs:	Federal:	\$47,708	Non-Federal:	\$31,817	Total: \$79,525

Objective:	To facilitate meetings with state water quality and natural resource agencies to disseminate and discuss findings from the evaluation, identify specific barriers to BMP implementation, characterize producers most likely to adopt BMPs, and forge a plan of action to minimize or eliminate barriers to adoption of water quality BMPs.		
Subtask 4.1:	Extension, with assistance from the TSSWCB, will coordinate two meetings with state water quality and natural resource agencies (i.e., NRCS, FSA, etc.) approximately six months apart. The first meeting will involve sharing the results of the statewide evaluation. The second meeting will focus on incorporating evaluation results into development of a targeted plan of action that specifically addresses barriers to conservation practice implementation in an effort to increase statewide adoption of water quality BMPs.		
	Start Date:	Month 1	Start Date: Month 24
Subtask 4.2:	Extension, with assistance from the TSSWCB, will develop a report summarizing information discussed in the meetings to be used as a guide for applicable state water quality and natural resource agencies.		
	Start Date:	Month 1	Start Date: Month 24
Deliverables	<ul style="list-style-type: none"> <li>Completion of two meetings comprising key state water quality and natural resource agencies.</li> <li>Final report summarizing meeting discussions.</li> </ul>		

#### Project Goals (Expand from NPS Summary Page)

The goal of this project is to promote healthy watersheds and improve water quality through continued delivery of the Lone Star Healthy Streams program, using both local and distance education in targeted watersheds across the state. This will be accomplished through the education of Texas livestock and landowners on how to best protect Texas waterways from bacterial contributions associated with the production of livestock and poultry. In addition, this project aims to share and communicate findings from a statewide evaluation designed to better understand the barriers and factors associated with the adoption and implementation of BMPs known to reduce bacterial contamination in waterways.

#### Measures of Success (Expand from NPS Summary Page)

- Delivery of a minimum of 10 LSHS local and 3 distance education trainings per year.
- Number of livestock producers and landowners participating in educational events delivered locally or through distance education.
- Number of unique visitors to the LSHS project website (<http://lshs.tamu.edu>).
- Number of factsheets, publications, and other educational materials distributed regarding the LSHS program and BMPs to reduce bacterial contamination.
- Increased knowledge and understanding by livestock producers and landowners of bacteria pollution and BMPs to reduce bacteria runoff and increased understanding of the expected adoption of BMPs.
- Enhanced coordination among state agencies to address barriers identified in the TSSWCB project 12-08 statewide livestock producer evaluation to help increase BMP adoption.

**2012 Texas Nonpoint Source Management Program Reference (Expand from NPS Summary Page)****Goals and/or Milestone(s)**

Component 1 – Explicit short- and long-term goals, objectives and strategies that protect surface and groundwater.

LTG: To protect and restore water quality from NPS pollution through assessment, implementation and education

1. Focus NPS abatement efforts ...and available resources in watersheds identified as impacted by NPS pollution.
2. Support the implementation of state, regional, and local programs to prevent NPS pollution through assessment ...and education.
4. Increase overall public awareness of NPS issues and prevention activities.

STG Three – Education: Conduct education and technology transfer activities to help increase awareness of NPS pollution and prevention activities contributing to the degradation of waterbodies... by NPS.

- Objective A – Enhance existing outreach programs at the state, regional, and local levels to maximize the effectiveness of NPS education.
- Objective B – Administer programs to educate citizens about water quality and their potential role in causing NPS pollution.
- Objective F – Implement public outreach and education to maintain and restore water quality in waterbodies impacted by NPS pollution.

Component 2 – Working partnerships and linkages to appropriate state, interstate, tribal, regional, and local entities, private sector groups, and Federal agencies.

Component 3 – Balanced approach that emphasizes both statewide NPS programs and on-the-ground management of individual watersheds

**Part III – Financial Information****Budget Summary**

Federal	\$318,056	% of total project	60%
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Non-Federal	\$212,116	% of total project (at least 40%)	40%
Total	\$530,172	Total	100%
Category	Federal	Non-Federal	Total
Personnel	\$183,197	\$115,295	\$298,492
Fringe Benefits	\$52,386	\$28,905	\$81,291
Travel	\$28,348	\$0	\$29,348
Equipment	\$0	\$0	\$0
Supplies	\$1,000	\$0	\$0
Contractual	\$0	\$0	\$0
Other	\$11,640	\$0	\$11,640
Total Direct Costs	\$276,571	\$144,200	\$420,771
Indirect Costs	\$41,485	\$37,492	\$78,977
Unrecovered IDC	\$0	\$30,424	\$30,424
Total Project Costs	\$318,056	\$212,116	\$530,172

#### Budget Justification (Federal)

Category	Total Amount	Justification
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Personnel	\$183,197	<p>Extension Program Specialist (1.0 FTE)</p> <ul style="list-style-type: none"> <li>Year 1: Annual Salary = \$60,000 * 1.03 = \$61,800</li> <li>Year 2: \$61,800 * 1.03 = \$63,654 (3% raise built in for Year 2)</li> <li><b>TOTAL: \$125,454</b></li> </ul> <p>Extension Forage Specialist @ 0.15 FTE/year (Educational delivery)</p> <ul style="list-style-type: none"> <li>Year 1: Annual salary = \$131,596 * 0.15 * 1.03 = \$20,332</li> <li>Year 2: \$20,332 * 1.03 = \$20,942 (3% raise built in for Year 2)</li> <li><b>TOTAL: \$41,274</b></li> </ul> <p>Extension Forage Specialist @ 0.10 FTE (Educational delivery)</p> <ul style="list-style-type: none"> <li>Year 1: Annual salary = \$78,768 * .10 * 1.03 = \$8,113</li> <li>Year 2: \$8,113 * 1.03 = \$8,356 (3% raise built in for Year 2)</li> <li><b>TOTAL: \$16,469</b></li> </ul>
Fringe Benefits	\$52,386	18% of personnel cost at effort plus \$647/mo/FTE group health insurance Fringe benefits are estimated based on salary estimates. Actual fringe benefits will vary but will not exceed the overall estimated amount in this category.
Travel	\$28,348	<p>Travel to/from Educational Programs, Project Meetings, and Conferences:</p> <p>* Estimates were calculated based on 10 locations/year x \$108/night (if overnight travel is required) + Mileage (at or below State rate), Fuel, or Rental Vehicle for trips ranging from 100-500 miles roundtrip + 2 days per diem @ \$59/day * 4 people</p> <ul style="list-style-type: none"> <li>\$108: This is the average of the highest and standard lodging rates listed for Texas on the GSA.gov website.</li> <li>\$59: This is the average of the highest and standard per diem rates listed for Texas on the GSA.gov website.</li> <li><b>TOTAL = \$11,865/year</b> [(\$108 * 10 locations * 4 rooms = \$4320) + (.565 * 500mi * 10 locations = \$2825) + (\$59 * 2 days * 10 locations * 4 people = \$4720)]</li> </ul> <p>* Travel costs associated with attendance at 1 National Conference and 1 regional conference for Extension Program Specialist (\$500 airfare + rental car @ \$35/day for 5 days + per diem @ \$59/day for 5 days + hotel @ \$108/night for 4 nights).</p> <ul style="list-style-type: none"> <li>\$500: This is an estimate for an airline ticket with destination outside of Texas. This estimate includes costs for checked luggage.</li> <li>\$35: This is based on the business contract rates that AgriLife Extension has with Enterprise Car Rental.</li> <li>\$108: This is the average of the highest and standard lodging rates listed for states outside of Texas on the GSA.gov website.</li> <li>\$59: This is the average of the highest and standard per diem rates listed for states outside of Texas on the GSA.gov website.</li> <li><b>TOTAL = \$2,309/year</b></li> </ul>
Equipment	\$0	N/A
Supplies	\$1,000	Printer toner, paper, office supplies, etc.
Contractual	\$0	N/A

Other	\$11,640	Off-campus printing of marketing/program materials and resource manuals (\$10,640) <ul style="list-style-type: none"> <li>▪ tri-fold brochure @ \$300/year (1,000 copies * \$0.30/color copy; rate based on estimate of 2-sided color copy from Texas A&amp;M AgriLife Copy Services)</li> <li>▪ factsheet @ \$300/year year (1,000 copies * \$0.30/color copy; rate based on estimate of 2-sided color copy from Texas A&amp;M AgriLife Copy Services)</li> <li>▪ presentation materials @ \$720/year (40 participants * 30 pages front/back of materials = 1,200 copies/event; 1,200 * \$0.06 (standard rate for black and white 2-sided copies from Texas A&amp;M AgriLife Copy Services) = \$72 in copy costs per event * 10 events = \$720/year</li> <li>▪ 80 resource manuals/year x \$10/manual x 5 types of manuals (beef, dairy, horse, hog, poultry) = \$4,000/year</li> </ul> Conference Registration fees: \$500/year = \$1,000
Indirect	\$41,485	15% of Total Direct Costs - Federal

### Budget Justification (Non-Federal)

Category	Total Amount	Justification
Personnel	\$115,295	Professor & State Forage Specialist (0.261 FTE) <ul style="list-style-type: none"> <li>• Year 1: Annual Salary = \$131,596 * 1.03 * 0.2610 = \$35,377</li> <li>• Year 2: Annual Salary = \$35,377 * 1.03 = \$36,438</li> <li>• <b>TOTAL: \$71,815</b></li> </ul> Assistant Professor and Extension Forage Specialist (0.264 FTE) <ul style="list-style-type: none"> <li>• Year 1: Annual Salary = \$78,768 * 1.03 * 0.264 = \$21,419</li> <li>• Year 2: Annual Salary = \$21,419 * 1.03 = \$22,061</li> <li>• <b>TOTAL: \$43,480</b></li> </ul>
Fringe Benefits	\$28,905	18% of Personnel Cost at effort plus \$647/mo/fte group health insurance
Travel	\$0	N/A
Equipment	\$0	N/A
Supplies	\$0	N/A
Contractual	\$0	N/A
Construction	\$0	N/A
Other	\$0	N/A
Indirect	\$37,492	26% of Total Modified Non Federal Direct Costs
Unrecovered IDC	\$30,424	11% of Total Direct Costs - Federal (difference between DHHS approved negotiated IDC rate of 26% and the 15% allowed per guidelines)